FIRST RECORD OF *PTEROMALUS MICROPS* (HYMENOPTERA: PTEROMALIDAE) IN THE NEW WORLD[1]

Dean S. Volenberg[2], Steven J. Krauth[3]

ABSTRACT: The parasitoid *Pteromalus microps* (Hymenoptera: Pteromalidae), reared from *Gymnetron antirrhini* (Coleoptera: Curculionidae) on *Linaria vulgaris* (Magnoliopsida: Scrophulariaceae), is recorded for the first time in the New World.

In North America, *Linaria vulgaris* Mill. was introduced from Eurasia as an ornamental perennial in the mid-1600's (Darlington 1859). Commonly called yellow toadflax or "butter and eggs", the plant competes with native species and interferes with low-till agricultural practices (Darwent *et al.* 1975). Yellow toadflax has become a serious weed problem in *Mentha* spp. L. and has infested over 7,000 acres in Wisconsin (Eagan *et al.* 1992). Peppermint *Mentha piperita* L. and spearmint *Mentha cardiaca* Gerde. or *Mentha spicata* L. are grown for oils. Weeds impart off-flavors and colors to the oil upon steam distillation of weed contaminated mint hay (Ellis *et al.* 1941; Schmidt and Binning 1996). Laboratory studies of an exotic root mining lepidopteran as a potential biological control agent are being conducted. In conjunction, established areas of high density of yellow toadflax in Columbia, Dane, and Waukesha counties, Wisconsin were surveyed for insects. Yellow toadflax was swept with an insect net and seed pods were collected for possible facultative natural enemies. Sweep sample collections were identified using the available literature (Kissinger 1964; Buchanan 1937) and proved to be predominantly *Gymnetron antirrhini* Paykull 1800 (Coleoptera: Curculionidae) (O'Brien and Wibmer 1982) and *Brachypterolus pulicarius* (Linnaeus) (Coleoptera: Nitidulidae). Insect rearings from seed pods also yielded *G. antirrhini*. *Gymnetron antirrhini* adults fed on yellow toadflax shoot tips. Females deposit eggs singly into the pericarp of newly opened flowers. This causes the formation of a small conical protrusion on the plant ovary (Smith 1959). The larvae feed within the ovary consuming ovules (seeds) which are inactivated during oviposition (Smith 1959). Rearings from yellow toadflax seed pods collected in Columbia and Waukesha counties in Wisconsin yielded several pteromalid wasps as well as *G. antirrhini*. The wasps were identified as *Pteromalus* sp.

Specimens submitted to the Taxonomic Services Unit, Systematic Entomology Laboratory, U.S.D.A., A.R.S., Beltsville, MD were identified as

[1] Received January 30, 1996. Accepted March 16, 1996.

[2] Department of Horticulture, University of Wisconsin, Madison, WI. 53706.

[3] Department of Entomology, University of Wisconsin, Madison, WI. 53706.

Pteromalus microps (Graham). This is the first New World record for this Palearctic species. *Pteromalus microps* was described in 1969 from specimens taken in Ireland and Britain (unlocalized) from the same curculionid host. It would appear that it was accidentally introduced along with the weevil which was released for purposes of biological control of *Linaria* (E.E. Grissell, pers. comm.). Species of *P. microps* are metallic-green with or without reflections of blue. The coxae and femora, except their tips, are concolorous with the thorax; trochanters partly dark; rest of legs testaceous with tips of tarsi fuscous: the fore tarsi mainly brownish. Wings hyaline; venation yellowish or testaceous. Length 2.6 to 3mm. Males are easily recognized by the characters of the oral fossa, mandibles, ocelli, antennae and propodeum (Graham 1969). Members of the genus attack the egg, larval and pupal stages of hosts in the orders Lepidoptera, Coleoptera and Diptera. One member of the genus is a hyperparasite of *Bruchophagus* (Hymenoptera: Eurytomidae).

Voucher specimens from these collections are deposited in the Insect Research Collection of the Department of Entomology, University of Wisconsin-Madison. More recently, *P. microps* has been reared from *Mecinus janthinus* (Coleoptera: Curculionidae: Gymnetrinae) in Alberta (Alec McClay, pers. comm.).

MATERIAL EXAMINED: WI: Columbia Co., University of Wisconsin Madison, Arlington Experimental Farms, Coll: 4-VIII-1995, emerged from pods of *Linaria vulgaris*, Coll: D. Volenberg, six females. Waukesha Co., Kettle Moraine State Forest, Coll:25-VIII-1994, Emerged:26-IX-1994, from seed pods of *Linaria vulgaris*, Coll: D. Volenberg, two males, one female. Waukesha Co., Kettle Moraine State Forest, Coll:26-IX-1994, sweep samples, Coll: D. Volenberg, three males, two females.

ACKNOWLEDGMENTS

We acknowledge with thanks the species level identification of *P. micros* by Eric Grissell of the Systematic Entomology Laboratory, USDA, ARS, Beltsville, MD. All other identifications were performed by the junior author. Funding for this study was provided by Hatch Funds #142D672 directed by H. J. Hopen, Department of Horticulture, College of Agricultural and Life Sciences, University of Wisconsin-Madison. We thank H. J. Hopen and D.L. Mahr, Department of Entomology, Wisconsin for reviewing the manuscript.

LITERATURE CITED

Buchanan, L.L. 1937. Notes on Curculionidae. J. Wash. Acad. Sci. 27:312-316.

Darlington, W. 1859. American weeds and useful plants. Orange Judd & Co., New York.

Darwent, A.L., W. Lobay, W. Yarish, and P. Harris. 1975. Distribution and importance in northwest Alberta of toadflax (*Linnaria vulgaris*) and its insect enemies (*Brachypterolus pulicarius*, *Gymnaetron antirrhini*). Can. J. Plant Sci. 55:157-162.

Eagen, K.A., T.R. Connell, B.A. Michaelis, R.L. Hughes, H.J. Hopen, and L.K. Binning. 1992. *Linaria vulgaris* severity and control in Wisconsin mint. Report. Mint Industry Research Council.

Ellis, N.K., K.I. Fawcett, F.C. Gaylord, and L.H. Baldinger. 1941. A study of some factors affecting the yield and market value of peppermint oil. Purdue Univ. Bull. No. 461. 27 pp.

Graham, M.W.R. de V. 1969. The Pteromalidae of northwestern Europe (Hymenoptera: Chalcidoidea). Bull. British Mus. (Nat. Hist.) Entomol. Suppl 16: 1-908.

Kissinger, D. 1964. Curculionidae of America North of Mexico: A key to genera. Taxonomic Pub. So. Lancaster, Mass.

O'Brien, C. and G. J. Wibmer. 1982. Annotated checklist of the weevils (Curculionidae *sensu lato*) of North America, Central America and the West Indies (Coleoptera: Curculionoidea). Mem. Amer. Entomol. Inst. 34:1-382.

Schmidt, W.G. and L.K. Binning. 1996. Impact of redroot pigweed (*Amaranthus retroflexus* L.), common lambsquarters (*Chenopodium album* L.) and barnyardgrass (*Echinichloa* crus-galli L.) on peppermint oil yield and quality. Abstract Proc. ann. meet. Weed Science Soc. Amer. 36:54.

Smith, J.M. 1959. Notes on insects, especially *Gymnaetron* spp. (Coleoptera: Curculionidae), associated with toadflax, *Linaria vulgaris* Mill. (Scrophulariaceae) Can. Entomol. 91: 116-121.

BOOK REVIEW

INSECTS OF THE GREAT LAKES REGION. Gary A. Dunn. 1996. University of Michigan Press. 324 pp. $42.50 Cloth, $17.50 ppbk.

In this book, the author has done an excellent job of presenting an overview of the insects of the Great Lakes Region. Although intended for localized, Great Lakes Region readership in its introductory background information and in species selection throughout, much of the subject matter is readily applicable to anywhere in northeastern and north middle America and south central Canada.

Introductory material includes a chapter on the geological and biological history of the Great Lakes Region covering subjects such as formation of the Great Lakes, landforms and soils of the region, climatic factors, pre- and post-glacial plant and insect biology and dispersal, and the current environment of the region. Another chapter covers the entomological history of the region, including introduced and endangered insects while a third introductory chapter presents a comprehensive review of distributional patterns of insects in the Great Lakes Region.

Following introductory information on insect classification and a key to the orders of adult insects in the region, the main text consists of descriptive writing, with marginal illustrations, of each of the major orders and families of common insects to be found in the region. For each order, the text presents a short introduction followed by sections on over-all descriptions, life cycles, habits and habitats, ecological and economic status, and distribution. For each family, selected specific insects are identified by both common and scientific names followed by a brief, identifying description. For most families there is a final paragraph citing sources for additional information on identifications and life histories that are included in the bibliography.

A unique feature of this book is a number (9) of "Quick Guides to Identification" in the form of tables organized by diagnostic characteristics that provide ready assistance to more easily separate the orders, and the families in the major orders. Completing the book is a glossary, an extensive bibliography, an index, and several appendixes listing entomological organizations, periodicals, institutional collections, zoos and butterfly houses, and collecting regulations, all dealing with insects of the Great Lakes Region. Overall, this book would seem to be an introductory MUST for amateur entomologists and insect enthusiasts as well as the general public throughout the Great Lakes Region.

H.P.B.